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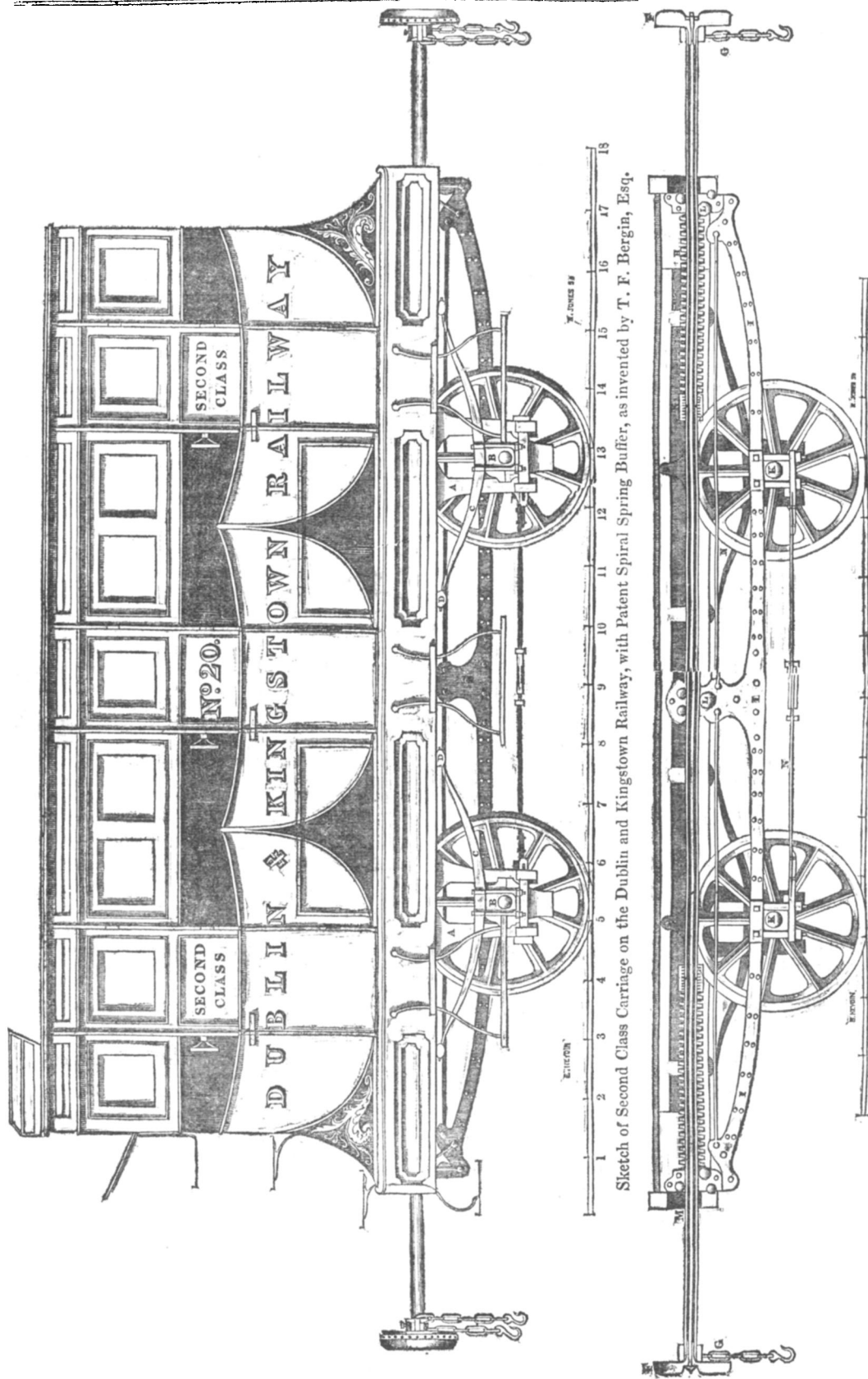
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Sketch of Second Class Carriage on the Dublin and Kingstown Railway, with Patent Spiral Spring Buffer, as invented by T. F. Bergin, Esq.

Geometrical Section along the centre of Carriage, showing the application of Patent Spring Buffer.
 Scale three-eighths of an inch to one foot.
 Sketched for the Penny Journal by Mr. E. Heyden.

DESCRIPTION OF THE NEW BUFFER, INVENTED AND APPLIED TO RAILWAY COACHES BY MR. T. F. BERGIN, AND FOR WHICH HE HAS TAKEN OUT A PATENT.

It is by no means fair to suppose that the little progress made in Ireland in manufactures, arts, or sciences, as compared with England, is in any degree to be attributed to a deficiency of intellect or mental energy in the people of the country; on the contrary, experience has proved, that where Irishmen have had opportunities of developing their talents, or exerting their energies, they have been found, if not superior, at all events fully equal to the inhabitants of any other country. Whether it be attributable to dame Nature, or to surrounding circumstances, there cannot be a question that, generally speaking, Irishmen possess a shrewdness and quickness of perception not always to be found in the inhabitants of the sister island. That this peculiar characteristic, under present circumstances, is frequently more of a curse than a blessing appears evident, as to it must be attributed much of the evil which we see around. How different would the state of things be, if to the energies and the minds of the people a proper direction were given.

We are led to those observations at the present moment from the circumstance of a train of steam-carriages on the Kingstown Railway stopping opposite the window at which we are seated; and which, although a moment before travelling at the rate of nearly thirty miles an hour, has pulled up to take in passengers, without the slightest apparent concussion taking place between any of the carriages, each one halting as though the entire train formed but one body of a self-moving carriage; an occurrence rendered particularly remarkable from the recollection of a very different scene witnessed about a year since in the Manchester Railway, when, by the concussion in stopping, many of the inexperienced in such matters were actually jolted off their seats.

Our readers will recollect that in several numbers of our second and third volumes we not only published an account of the line of Railway from Dublin to Kingstown, but gave a very minute description of the carriages, as well as of the method by which they are propelled along the line of road. We now give an engraving of one of the carriages, with a section showing the manner in which the Buffer, invented by Mr. Bergin, acts. The drawing and following remarks on the various buffers hitherto used, have been kindly furnished to us by Mr. E. Heyden.

"It is well known, that a heavy body moving on a plane surface, if suddenly stopped, causes a great concussion; to remedy which evil in railway coaches, has been a matter of some thought to scientific men. Various plans were tried from time to time on those in use on the Liverpool and Manchester Railway. At the Liverpool end of the line the coaches were drawn through the tunnel by means of an endless rope passed over a range of pulleys, and worked by a stationary engine. On account of the great length and elasticity of the rope, the carriages move off pretty easy; but at the Manchester end, where the locomotive power is directly attached to the carriages, the shock was severely felt at the several places for stopping, especially by the unfortunate passengers of the second class carriages.* Indeed I was much surprised that notwithstanding all the experience which *Englishmen* had, especially on the Liverpool and Manchester Railway, the latest contrivance for preventing concussion was neither more nor less than circular pieces of cloth, made somewhat on the principle of a seat cushion, with a round hole in the centre of each, which moved on a wrought iron pin attached to the end of the carriages, and was pressed, on receiving the shock from any body, by means of a hollow cylinder, somewhat like a firkin, or *drum with one end*, forming altogether a clumsy apparatus on the ends of the carriage, and having little or no elasticity.

* On the Liverpool and Manchester line there are only two classes of passenger coaches—their first class exactly the same as the second class on the Dublin and Kingstown Railway, and the second class are infinitely inferior to the Dublin and Kingstown third class, inasmuch as they want buffers, and sheeting at each end, as protection from weather.

"I shall now endeavour to explain the principle of the 'Patent Buffer,' which differs in every respect from those heretofore in use, as it combines strength with little weight, (when compared with the several methods before adopted,) and is constructed with such a degree of simplicity as almost to induce the belief that economy was studied in its formation.

"In order to give a correct idea of the value of the improvement introduced by Mr. Bergin, and to enable persons unacquainted with the subject to understand the drawings we have given, it may be necessary to state, that the *carriage* is the under part of the *railway coach*, or that part to which the steps are attached, and may be either constructed wholly of wood or iron. The one of which the foregoing is an exact representation, has a framing of wood, (as represented in the drawing of the section, which shows the inside,) and is sheeted on the outside with iron, eleven inches wide, and one quarter or three-eighths of an inch in thickness. It is of a rectangular form, and is in length from one extremity to the other seventeen feet, by six feet in width. To this framing is firmly, and with a very great degree of accuracy, attached four *axle guards*, (see A,) which move in grooves previously made in the metal oil boxes (B), and in which are concealed coupling-brasses, or bearings, to work on the ends of the axles. The centre of each spring (C) is made fast on these oil boxes, and each end moves freely on a roller concealed in the roller box (D); from this arrangement it will appear evident, that when a weight in the coach is either decreased or increased, the spring apparently either contracts or expands in length, and the axle guards (which are attached to the carriage) slide up and down the grooves of the oil boxes, and are, consequently, always at one level on the ends of the wrought iron axles.

"The buffer invented by Mr. Bergin consists of a wrought iron tube twenty-two feet in length, which, for practical convenience, consists of three parts, screwed together, or united by strong ferules or bands (see C in sketch in section); this tube is three inches diameter, and one quarter inch in thickness, somewhat like a large gas-pipe, or water conductor. At either extremity of this tube the buffer-heads (F) are made fast, by means of a long bolt, which passes along through the centre of the tube; previously to which, two draw bars, with connecting chains, are passed transversely on the ends (G.) A spiral spring (H), formed of steel three-quarters of an inch square, is coiled round the tube, and is confined between the ends of the carriage and the screwed bands before mentioned. This tube is supported always at one height, by means of the inverted arch (I), which is supported by bearings previously made in the centre of each axle (K). It will be seen, that when the end of the buffer (F) is struck, the tube passes between the rollers (L), and again recoils, or rebounds rather, into its original position, by means of the elasticity of the spring at either end. There is an oblong hole in the ends of the carriage, shown by the dark shade (M) in section, which allows the coach to lower with the increase of weight, without in any way affecting the tube. The friction rollers at each end greatly assist the operation. The tension-rods (N) tend to strengthen the arches, of which there are two, (between these the tube moves,) and are connected by rivets and the rollers before mentioned.

"This buffer, from its peculiar arrangement, possesses another great advantage. As the entire weight of the coach is at all times directly on the extremity of the axles, the centre must have some tendency to rise, if we consider the wheel as a fulcrum; and if so, it is impossible the axles can revolve without a great degree of friction. Supposing the axle to be one hundred weight, the length between the wheels four feet eight inches, and the bearing outside the wheel eight inches—now in this case, if the axle were separated in the centre, it would require a weight of one hundred and ninety-six pounds to counteract the weight of half the axle, or fifty-six pounds, taking the wheel as a fulcrum or centre of action; and as the coach when loaded is not less than two tons, the one-fourth part of which rests on the extremity of each axle—that is, nine hundred and twenty-four pounds of effect—

tual pressure against fifty-six pounds—or, in round numbers, eight hundred weight counteracted by nothing except the strength and nature of the iron. The 'patent spiral spring buffer,' as invented by T. F. Bergin, Esq. has removed several of the objections relative to the construction of railway coaches here stated, inasmuch as it is entirely supported from the centre of the axles, the weight of which, consequently, causes the axle to revolve freely, and with a degree of steadiness and perfection never before attempted or thought of.

RAILWAYS IN IRELAND.

The success of the Manchester and Liverpool Railway in England, and of the Dublin and Kingstown Road in our own country, has given a great stimulus to the speculation in, and projection of similar undertakings. The importance and necessity of rapidity, and certainty of communication between the several parts of a country, the seat of a vast and increasing commerce, having exhausted the utmost powers of the old systems of locomotion; any means of accelerating the rate of travelling, or of conveying goods, were gladly adopted. But, notwithstanding the improvements of roads and carriages, and the removing of all outward impediments, the natural limits of animal speed could not be overcome. Hence, the mercantile community with eagerness seek to avail themselves of the only substitute for horse power, which is at present applicable to the purposes of rapid communication—steam carriages moving on iron railways. Steam carriages on common roads have not attained, we believe, at their highest velocity, a speed equal to the ordinary rate of railway travelling. We have no doubt, their swiftness will be much increased; but in the meantime, improvements will also have been effected on railroads, the engines on which may, indeed, be accelerated to any degree of speed. Dr. Lardner sees no obstacle to prevent fifty or sixty miles an hour becoming the ordinary rate on railways. It is to be observed also, that the engine on the common road, moving at ten or twelve miles an hour, draws with it but a single carriage; while an equal weight can be drawn on a railroad at least thirty miles an hour.

Such is the general confidence in what has already been, and may be, accomplished on railways, that the public eagerly embrace any railroad project brought before them. According to Mr. Vignoles, the engineer, there are in Great Britain 250 miles of railways "in profitable operation;" 400 miles in progress, and Companies formed or forming for the construction of 1400 miles more. But this adventurous spirit of speculation may be carried too far; ignorant persons may be led rashly to embark in railroad schemes, which probably will never be accomplished, and into which none should enter without due examination of the likelihood of success. The *railroad mania* has hitherto been confined to England; in this country, indeed, there prevails an apathy, and a timorous reluctance to engage in great speculations of the kind; arising, without doubt, from the failure of almost every public work, hitherto undertaken in Ireland. Our design, therefore, is briefly to lay before our readers such information as may assist the formation of opinion on the probable advantages and results of such works, as well as on the comparative merits of those which have been already proposed. The first and second reports of the Committee on Public Works in Ireland, which sat in August last, and of which, Mr. Lynch, the member for Galway, was chairman, has been just printed, and contain a mass of most valuable evidence on the subject of this article, as well as on many other points connected with the improvement of Ireland. These reports form the chief sources and authority for the statements which follow.

In the preceding observations, we have given some of the reasons for the preference of railroads to other modes of transport; and this being almost universally acknowledged, we do not think it necessary to enter further on this part of the subject. There are some objections to their adoption in Ireland, which we shall briefly notice. The unwillingness of the public to vest their money in these works, the cause of which we have already men-

tioned, will, there is no doubt, disappear, if the schemes proposed exhibit fair prospects of a return. And no small encouragement is afforded by the success of the only railroad, as yet executed in Ireland, whose shares, on which £60 have been paid, now sell at £84. The immediate advantages of the Dublin and Kingstown Railway, Mr. Pim is right in thinking, will be equalled by the benefit it will confer, by tending to remove the common opinion, that no great public work can succeed in Ireland. There is in the country, capital sufficient for all the schemes which have, or may be put forward: many of the shares in the English speculations have been purchased by Irishmen—500 shares in the London and Birmingham road were quickly sold here; and in other English undertakings we have shown equal readiness to assist. Mr. Pim, who is a stockbroker, as well as treasurer of the Dublin and Kingstown Railway, conceives that a million, (the amount he recommends to be subscribed for the Valentia Railroad) can easily be procured in Ireland. If Irishmen hesitate to advance their funds for these objects, the capital will be readily obtained in England. In that country about £50,000 of the stock of the Kingstown Railway were purchased; and almost the whole of the shares, to the amount of a million, of a company for making a trainroad between Waterford and Valentia,* has been already subscribed in Bristol, London, and other towns in England, very few having been taken in Ireland. It has been alleged too, that railways in Ireland will be exposed to the blind and lawless violence of the country people, who will do their utmost mischief to thwart these projects, by injuring the roads, and rendering them impassable. Mr. Pim's evidence applies strongly to this point: "Notwithstanding many predictions, there never was any attempt made to injure our works on the Dublin and Kingstown Railway, either during their construction, or since they have been opened." They are driven to these outrages by their distress, which the execution of a railroad will do much to remove; as Mr. Pim observes, "we always find the people tranquil, when well fed." Besides, the novelty and strange aspect of that might-monster, the steam engine, in rapid motion, will fill them with admiration, and inspire them with respect for the means by which such wonders are accomplished. The number of attendants too, which the nature of a railroad constantly demands, will furnish no inconsiderable protection.

Mr. Pim and Mr. Cubitt state, that the Irish workman is in every respect equal to the English, when once taught the operations necessary, which may be effected by the mixture of a few skilful men amongst them: 1 or 2 in 100 was sufficient with those engaged on the Kingstown road. A great advantage to the country is obtained by the facilities thus afforded for the instruction of labourers, who, in general, when they leave works of this description, receive employment and good wages readily, in consequence of their superior skill. The enginemasters, tending the carriages of the Kingstown Railway, are English, but the company are training others, natives, to succeed them, with a "certainty of success." The progress of railways in Ireland is not impeded by one circumstance, which is a great obstruction to their accomplishment in England. The surface of our native land is but thinly scattered over with those noble baronial castles, and proud ancestral residences of the wealthy, which, with their extensive parks, and rich lawns, thickly cover the sister country, and add so much to its beauty. The gentry are, of course, unwilling to sacrifice their privacy and their fair grounds to the noisy and whirling bustle of a public railroad. No such objection exists here; nay, we find the landlords offering their lands, as free gifts, to the railways; and perhaps this is the first instance of Ireland's deriving benefit from her gentry being absentees.

The advantages of rapid communication between distant parts of the country need not here be enlarged on; and how imperfect are the modes of travelling in many of the provincial parts of Ireland, must be known to all. From the number of conveyances at present employed in

* This road is for carriages drawn by horses, conveying goods at fifteen or sixteen miles an hour.